

Chapter highlights

- **Purpose:** This chapter sets forth VITA's policies and guidance on preparing effective specifications and requirements for the procurement of information technology (IT) goods and services.
- **Key points:**
 - By their nature, specifications set limits and thereby eliminate or restrict items that are outside the boundaries drawn. Technology specifications should be written to encourage, not discourage, competition consistent with seeking overall economy for the purpose and technology solution intended.
 - Specifications constitute the heart of a contract document that will govern the supplier of required goods or services in the performance of the contract as well as the basis for judging compliance.
 - Fixing a requirement error after delivery can cost up to 100 times the cost of fixing the implementation error.

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8.0 Introduction

The technology procurement process is much more than buying technology or telecommunications goods and services. The process includes all activities from planning, preparation of requirements and processing of a requisition, solicitation, evaluation, award

and contract formation, to receipt and acceptance of delivery, payment, inventory tracking and goods and services disposition. Regardless of whether the technology product or service required is processed by the agency under its delegated authority, purchased off a statewide contract or sent to VITA for procurement, the workflow is essentially the same.

Here are two things that need to be considered when preparing to make any technology acquisition:

- Identify the technology business need and the type of technology product or service that will best fulfill that technology need. Identify a technology solution, not a specific product, which would meet that technology need. Keeping in mind cost containment, what is the product or service that best fulfills the job requirements? This may require that the agency purchasing personnel or VITA personnel meet with end user(s) to identify needs, craft requirements and propose technology solutions.
- Develop requirements and/or specifications that describe the characteristics of the technology product, service or solution being sought. Consideration should be given to suitability and to overall cost effectiveness in addition to acceptability and initial price. By their nature, specifications set limits and thereby eliminate or restrict items that are outside the boundaries drawn. Technology specifications should be written to encourage, not discourage, competition consistent with seeking overall economy for the purpose and technology solution intended. The goal is to invite maximum reasonable competition while procuring the best technology solution for the Commonwealth.

VITA's Supply Chain Management directorate may provide assistance in preparing specifications, requirements or purchase descriptions for IT procurements which are being conducted by an agency pursuant to their delegated authority or if VITA has delegated a specific procurement to an agency. Please e-mail scminfo@vita.virginia.gov for assistance.

8.1 Information technology specifications

An information technology (IT) specification is a description of a technology product or service a customer seeks to procure and is also a description of what a supplier must be prepared to offer to be considered for an award. Specifications describe the technical requirements for a material, product, or service and include the criteria for determining whether these requirements are met. A specification may describe the performance parameters which a supplier has to meet, or it may provide a complete design disclosure of the work or job to be done. Specifications for service contracts normally take the form of a statement of work.

Specifications are the primary means of communication between the Commonwealth and its suppliers. Specifications also provide the basis for judging whether or not the supplier has met the requirements in the solicitation. The nature of the technology good or service being procured will determine whether specifications will be long or short and what descriptive format should be used. Most specifications contain a description of the requirements and quality assurance provisions and will thoroughly define the minimum requirements of the needed technology.

Specifications are the only way to obtain the goods or services required. Specifications constitute the heart of a contract document that will govern the supplier of required goods or services in the performance of the contract as well as the basis for judging compliance. A good specification promotes full and unrestricted competition through setting forth actual, minimum requirements as opposed to desires. Specifications should also contain quality assurance provisions which provide a means of determining that the supplier has met the

contractual requirements. Specifications should be clear and precise. If requirements are ambiguous or leave room for interpretation, suppliers are entitled to make interpretations that work to their own advantage. A good specification should:

- Be based on need.
- Emphasize performance rather than design.
- Not require features not needed for the product's or solution's intended use.
- Identify the essential characteristics of the desired product or solution.
- Should not be written by a bidder or prepared with the assistance of a potential bidder.
- Generally provide for commercial, off-the-shelf products which are widely available in the marketplace.
- Avoid unique requirements.
- Allow for competition to the maximum extent possible.
- Be quantifiable rather than qualitative.
- Be verifiable.
- Not overstate quality.

Specifications must always be clear and understandable. They must permit competition between products of equal quality. Specifications may include a statement regarding the qualitative nature of the purchase and should identify minimum essential characteristics and standards to which the purchase must conform if it is to satisfy its intended use.

Performance requirements or specifications should be identified. Specifications control:

- The quality level of the product,
- The amount of competition,
- The suitability of the product, solution or service for the job to be done,
- The method of evaluation used in making an award and in determining the best value bid for the purchase.

8.2 Characteristics of effective IT specifications

Effective IT specifications will be written with certain characteristics that include:

- Simple: Avoid unnecessary detail, but be complete enough to ensure that requirements will satisfy their intended purpose.
- Clear: Use terminology that is understandable to the agency and its industry partners. Use correct spelling and appropriate sentence structure to eliminate confusion. Avoid legalese type language and jargon whenever possible.
- Accurate: Use units of measure compatible with industry standards. All quantities and packing requirements should be clearly identified.
- Competitive: Identify at least one or more commercially available brands, makes, or models (whenever possible) that will satisfy the intended purpose. Avoid unneeded extras or functionality that could reduce or eliminate competition and increase costs.
- Flexible: Avoid inflexible specifications which prevent the acceptance of a proposal that could offer greater performance for fewer dollars. Use approximate values such as dimensions, weight, speed, etc. (whenever possible) if they will satisfy the intended purpose. If approximate dimensions are used, it should be within a 10% rule of thumb unless otherwise stated in the solicitation document.

In order to promote fair and open competition among all suppliers, specifications should be written as generically as possible. IT business owners and agencies should avoid writing restrictive requirements/specifications by:

- Including only essential requirements of the IT good or service needed in the specifications.
- Avoiding restrictive or impractical requirements such as those that are nonessential or obsolete.
- Carefully checking delivery requirements to ensure the turnaround time from supplier's receipt of order to delivery is not too restrictive or limiting.
- Defining requirements to promote and encourage suppliers to propose standard, commercially available products, solutions or services where possible.
- Not specifying a particular brand name, product or feature that is peculiar to one manufacturer, except for reference purposes.
- Not dictating detailed design solutions prematurely.
- Allowing sufficient time for suppliers to review the technology need, consider the requirements, and prepare and submit a proposal.

One of the first considerations in preparing specifications should be determining what type of specifications will best describe the technology or telecommunications needed. There are certain types of specifications: standard, design, performance, or brand.

8.3 Standard specifications

Standard specifications are those that are used for most purchases. In order to develop standard specifications, an agency may examine the characteristics and needs for products, solutions or services of similar end usage and develop a single specification that will satisfy the need for most purchases. Standard specifications are created for the express purpose of establishing performance and quality levels. Standard specifications may be particularly useful for commonly used items. Standard specifications may also reduce the variety of items being purchased, thus facilitating the consolidation of requirements into larger volume bids. Standard specifications eliminate duplicative specification writing.

8.4 Design specifications

Design specifications set the requirements for the product or solution being purchased by detailing the desired characteristics. To fully describe the agency's need, design specifications may be very lengthy. However, great care must be taken to ensure that design specifications are not written so tightly that they unfairly preclude other suppliers from offering their supplies or services.

Design specifications set forth the physical characteristics of the item to be procured in definitive terms. Design specifications may also include the dimensions, tolerances and specific manufacturing processes. Drawings or other detailed instructions should describe the product when utilizing design specifications. Design specifications are not conducive to procuring commercial off-the-shelf products and the specifications are not tailored to the commercial market place. Design specifications, may, as a result of being over-specific, unnecessarily limit the competition for a particular product, solution or service.

8.5 Performance specifications

Performance specifications (or functional specifications) are more widely used and more flexible than design or standard specifications. Performance specifications describe the needed or desired capabilities of the product, solution, services and/or supplier, or performance requirements for deliverables. Performance specifications provide a description and purpose of the IT product or service needed but only include minimal functional specifications, usually including only those functions which correlate specifically with identified agency or Commonwealth business needs. Performance specifications should be compatible with existing equipment and should contain a description of the existing equipment along with any upgrade requirements or future needs.

Performance specifications identify the requirements of the IT product or solution needed in terms of capacity, function and operation. These specifications should state what the needed product or solution is to do without setting out specific technical detail. Performance specifications can include requirements for output, capacity, dimensional limitations, maneuverability, degree of tolerance or accuracy and other needs. Usually, performance specifications do not describe the best available item on the market but describe exactly what the agency needs to meet its business objectives. If the performance specifications are restrictive, the solicitation should be specific as to why the restrictive requirements are necessary for the particular business need. If maintenance is a requirement, the specifications should include what maintenance arrangement would be most acceptable to the agency for the items being purchased.

Performance specifications throw the responsibility for a satisfactory IT product, solution or service back to the supplier. Because performance specifications are results- and use-oriented, the supplier is left with the decision of which product, solution and/or service would be most suitable for the agency's needs.

8.6 Brand name specifications

Brand name specifications are the most restrictive type of specification. Brand specifications should only be used when there is only one brand, which for reasons of expertise and/or standardization, quality, compatibility with existing equipment, specifications or availability is the only brand acceptable to meet a specific need. When it is determined to be impractical to develop a generic specification, a brand name may be used to convey the general style, type, character and quality of the article desired. Unless otherwise provided in the solicitation the name of a certain brand, make or manufacturer does not restrict potential suppliers to the specific brand or manufacturer named. In addition, a brand specification (or sole acceptable brand) may be available from more than one source and should be competed. Any agency which is brand-specific in its IT needs should be mindful that any rejection of similar, but not brand-specific, products should be based solely on an equitable evaluation of comparable products and their failure to meet a specific stated need.

Brand specifications may be used to establish a standard of quality. If a brand specification is used, it should include the common generic identification of the IT product, the make, the model or catalog number and the name and address of the manufacturer as well as an itemization of the salient characteristics, performance or other criteria that are required of the brand name IT product. A brand specification should only be used to purchase a standard IT product for which a complete definition is impractical. Use of a brand name specification can promote competition if there are enough "equals" to the brand in the marketplace. Brand name or equivalent specifications shall seek to designate three, or as many different brands as are practicable, as "or equivalent" references and shall further state that substantially equivalent products to those designated may be considered for award.

A brand name proprietary specification restricts the acceptable IT products to those of one or more specified manufacturers. It is appropriate to use a proprietary specification when the desired product must be compatible with or is an integral component of existing equipment or products, or where prequalification of products is necessary to support specific needs of a program; is covered by a patent or copyright; must yield absolute continuity of results; or is one with which an agency has had extensive training and experience, and the use of any other similar piece of equipment would require considerable reorientation and training. Every effort should be made in the solicitation process to obtain full competition

among value-added resellers (VARs) or distributors which carry the manufacturer's IT product.

A written determination for the use of a proprietary specification must be made in advance of the procurement and be included in the procurement file.

8.6.1 When to use brand name or equivalent specifications

Brand name or equivalent specifications may be used when the IT purchasing professional or business owner determines that:

- No other design, performance, or qualified product list is available;
- Time does not permit the preparation of another form of purchase description, not including a brand name specification;
- The nature of the product or the nature of the requirements makes use of a brand name or equivalent specification suitable for the procurement; or
- Use of a brand name or equivalent specification is in the Commonwealth's best interest.

8.6.2 Required characteristics of brand name specifications

Unless the IT purchasing professional or technology business owner determines that the essential characteristics of the brand name included in the specifications are commonly known in the industry or trade, the brand name or equivalent specifications shall include a description of the particular design, functional, or performance characteristics required.

8.6.3 Nonrestrictive use of brand name or equivalent specifications

Where a brand name or equivalent specification is used in a solicitation, the solicitation shall contain explanatory language that the use of a brand name is for the purpose of describing the standard of quality, performance, and characteristics desired and is not intended to limit or restrict competition.

8.6.4 Determination of equivalents

Any prospective supplier may apply in writing for a pre-bid/proposal determination of brand name equivalence by the agency purchasing professional who is assigned to the procurement. If sufficient information is provided by the prospective suppliers, the agency purchasing professional may determine, in writing and prior to the bid or proposal opening time, that the proposed product would be equivalent to the brand name used in the solicitation. Any IT product which the Commonwealth, in its sole discretion, determines to be the equal of that specified, considering quality, workmanship, economy of operation and suitability for the purpose intended, shall be accepted (*Code of Virginia, §2.2-4315*). When brand or manufacturers' names are specified, and one or more of these are known to be Virginia brands or manufacturers, those known to be from Virginia shall be listed first prior to listing non-Virginia brands or firms.

8.6.5 Specifications of equivalents required for bid/proposal submittal

Suppliers proposing equivalent products must include in their bid/proposal submittal the manufacturer's specifications for those products. Brand names and model numbers are used for identification and reference purposes only.

8.6.6 Code references regarding brand names

[§2.2-4315](#) of the *Code of Virginia*, Use of Brand Names: "Unless otherwise provided in the Invitation to Bid, the name of a certain brand, make or manufacturer shall not restrict bidders to the specific brand, make or manufacturer named and shall be deemed to convey the general style, type, character, and quality of the article desired. Any article that the public body in its sole discretion determines to be the equal of that specified, considering

quality, workmanship, economy of operation, and suitability for the purpose intended, shall be accepted" and afforded the opportunity to compete for such contracts. Performance-based specifications when procuring personal computers and related peripheral equipment pursuant to any type of blanket purchasing arrangement shall be established without regard to 'brand name.'

[§2.2-2012](#)(C) of the *Code of Virginia* provides as follows: "C. If VITA, or any agency or institution authorized by VITA, elects to procure personal computers and related peripheral equipment pursuant to any type of blanket purchasing arrangement under which public bodies, as defined in § 2.2-4301, may purchase such goods from any vendor following competitive procurement but without the conduct of an individual procurement by or for the using agency or institution, it shall establish performance-based specifications for the selection of equipment. Establishment of such contracts shall emphasize performance criteria including price, quality, and delivery without regard to "brand name." All vendors meeting the Commonwealth's performance requirements shall be afforded the opportunity to compete for such contracts."

8.7 Qualified products/suppliers specifications and lists

It is sometimes necessary to prequalify products or suppliers and only solicit those who have been prequalified. In such cases, a list is maintained of specific products (QPL) or suppliers (QSL) which have been evaluated and determined to be acceptable in meeting predetermined minimum acceptable levels of quality or performance (*Code of Virginia*, [§2.2-4317](#)). This qualification is performed in advance of any particular IT procurement. By having a prequalification procedure, the time in the purchase cycle for specification development and testing can be reduced. The qualification requirements for supplier or product prequalification must be established and potential suppliers advised by letter and/or public posting sufficiently in advance of the anticipated procurement to allow for evaluation and qualification of potential suppliers and/or products. A supplier whose product or service has been determined not qualified will be advised in writing. Solicitations may be sent to only those suppliers determined to be qualified.

A QPL or QSL provides an advance determination as to which IT suppliers or products can meet the agency's requirements. A QPL identifies various brands that have met specific criteria. Bidding may be limited to those suppliers whose products are on the list. Awards then may be made to IT products on the QPL. A supplier who submits a bid/proposal for a non-QPL product when a QPL product is required is deemed nonresponsive.

The benefits of a developing a QPL can be many. The solicitation may then be used for submission of samples or products to be examined for initial inclusion on the list. Specifications should state the criteria that will be used to evaluate the IT products offered and should describe all requirements necessary for supplier's products to qualify for the list. A specifications draft may be circulated for review by suppliers and known interested bidders. Communication with interested suppliers when developing specifications and requirements may be very helpful. Potential suppliers may provide useful feedback on the feasibility of a particular requirement or specification, including performance requirements, statements of work and data requirements.

8.8 Building IT requirements

Procurement requirements are defined as the need or demand for personnel, equipment, facilities, other resources, or services, by specified quantities for specific periods of time or at a specified time. Requirements are defined by the agency's business owner, and translated into a specification by the business owner and the agency's technical subject matter experts (SMEs). Requirements definition is the most crucial part of the IT project.

Incorrect, inaccurate, or excessive definition of requirements may result in schedule delays, wasted resources, or customer dissatisfaction. To develop good requirements, remember the following:

- Always thoroughly examine the IT business need being procured.
- Write a clear statement of project objectives and scope.
- Know the difference between wants and needs.
- Examine the requirements definition interactively with the business owner and customer, if different from the business owner and the technical SMEs.
- Conduct a thorough and comprehensive analysis of the requirements.
- Document the results unambiguously in sufficient detail.
- Put the requirements document under version control.

A good requirement states something that is necessary, verifiable and attainable. To be verifiable, a requirement must have criteria for acceptance. To be attainable, the requirement must be technically feasible and within budget, schedule and other constraints. The most common problems in writing requirements include:

- Making bad assumptions.
- Writing implementation (how to do something) instead of requirements (what the customer needs as an end product or service).
- Using incorrect industry technology terms.
- Missing, ambiguous or conflicting requirements.
- Overlooking future requirements and/or interface requirements for existing systems.
- Over-specifying.

The requirements analysis should begin with an agency's business or organizational requirements and those requirements should translate into project requirements. If meeting the stated requirements will be unreasonably costly, or take too long, the project requirements may have to be negotiated down, down-scoped or down-sized, through discussions with SMEs, customers or users.

Any discussion of requirements analysis methods will quickly become specific to the type of project effort. Many industry areas have specific, proven techniques for obtaining thorough and accurate definition of requirements. Sometimes it is useful to write a draft users' manual as a way to define requirements. While the methods may differ, the principles remain the same across all types and sizes of projects. The requirements analysis should cover the whole scope of the project. It must be comprehensive and thorough and must consider the views and needs of all the project stakeholders.

The requirements document is the official statement of what is required of the IT supplier, product or solution. It is not a design document. As far as possible, it should set forth what the product, solution or supplier should do, rather than how it should be done. The requirements document should include both a definition and a specification of requirements and include both functional and technical data.

The agency and the subject matter experts (SMEs) involved in the technology project understand the requirements needed to support the business need. [VITA SCM](#) or [Project Management Division](#) may, when required or necessary, facilitate consolidating this information into the requirements document. This document describes the functional needs of the business unit, and the technical requirements to support the functionality. VITA will work with the agency's procurement project team to ensure a clear and comprehensive requirements document. The agency and business owner must commit the time and

resources required to support the timely, accurate development of the requirements document. This document will ensure an accurate and complete response from the competing suppliers.

There are four basic type of technology procurement requirements—mandatory, functional, technical and work. The following subsections provide discussion of these four types.

8.8.1 Mandatory requirements

Mandatory requirements are an agency's must-have requirements. If there are a large number of mandatory requirements included in the solicitation, competition will be reduced as each potential supplier must meet the intent of each mandatory requirement, thus reducing the number of eligible offerors.

8.8.2 Functional requirements

Functional requirements document the business functionality for the IT product, service or solution that will meet the agency's needs. The procurement project's SMEs and business owner will provide the necessary documentation of the needed functionality. The functional requirement documentation is complete when the defined functional requirements of the business need have been fully described and all team members have agreed to the documentation.

Pre-solicitation planning time is the best time to validate the functionality requirements. Incomplete functional requirements make it impossible to prepare accurate technical requirements documentation and lead to extended project time and often failed implementation. Ensuring that comprehensive, complete and accurate functional requirements are included in the solicitation will increase the likelihood of a successful procurement. Functional requirements for an IT project include, but are not limited to:

- Work flow or business processes,
- Scope (what is included and what is not included),
- Inputs, outputs (files, systems, programs, reports),
- Databases,
- Interface requirements
- Reporting requirements (hourly, daily, weekly, monthly hard or soft copy),
- Work rules,
- Performance standards and remedies for non-performance,
- Documentation deliverables (methods, hard or soft copy).

8.8.3 Technical requirements

Technical requirements for an IT product or solution must include complete descriptions of the technical needs of the software or solution that will meet the agency's business and technical needs and VITA's technical standards. The agency's IT business owner and the project's technical SMEs will be responsible for defining and documenting the project's technical requirements. [VITA's Project Management Division](#) can assist with this process. Technical requirements include items such as:

- Hardware
- Architecture
- Software
- Platforms
- Materials
- Space requirements
- Maintainability

- Energy requirements
- Materials
- Interfaces
- Program libraries
- Capacity limitations (scaling requirements)
- Operating systems
- Connectivity
- Capacity
- Construction
- Brand standards

8.8.4 Work or performance requirements

Work or performance requirements describe what the supplier must do to accomplish the work or deliver the required products, services or solution that may be unique to a particular IT project. Work requirements may cover the required qualifications of a supplier, specific tasks and subtasks to be completed, parameters and restrictions on performance, time for completion of work (if not otherwise stated) and a list of deliverables the supplier must provide.

8.8.5 Requirements quality control

Before any IT solicitation is released, the business owner, SMEs and the IT procurement professional should complete the following steps to verify all requirements are included in the solicitation:

- Verify that the requirements actually define what is being procured. Fixing a requirement error after delivery can cost up to 100 times the cost of fixing the implementation error.
- Validity check: Do the requirements provide the functions which best support the agency's needs?
- Consistency check: Are there any conflicts or ambiguities in the requirements?
- Completeness check: are all performance, technical and functional requirements and expectations required by the agency included?
- Realism check: Can the requirements be implemented given available time, budget, resources and technology?
- Verifiability: Are the requirements realistically testable?
- Comprehensibility: Are the requirements easily understood?
- Traceability: Is the origin of the requirements clearly stated?
- Adaptability: Can the requirements be changed without a large impact on other requirements?

8.8.6 Prohibition against wired requirements

Incomplete requirements or "wired" requirements biased toward a particular supplier or solution will limit the number of competitive proposed solutions received. In keeping with the Commonwealth's commitment to foster open and fair competition and to good faith dealings with suppliers, no agency should create or knowingly issue a wired solicitation.

8.8.7 Assistance by suppliers or potential suppliers in developing procurement specifications or requirements

A potential or existing supplier may provide technical assistance to an agency free of charge in developing procurement specifications or requirements. However, an agency may not accept a bid or proposal or award a contract to a supplier who received compensation from the agency to provide assistance in the preparation of the specifications on which the solicitation or contract is based. A supplier who assists an agency in developing specifications or requirements may not disclose to any potential supplier who plans to

submit a bid or proposal information concerning the procurement which is not available to the public. In addition, the supplier who provided such development services for payment may not be a subcontractor or partner for the supplier who is awarded the contract or any of that supplier's subcontractors or partners, however far removed. Any independent contractor employed or otherwise paid by an agency to design a project, develop a scope of work, write specifications, or otherwise define contract requirements is also not eligible to compete for or receive the resulting contract.

A public body may permit a supplier who assisted in the preparation of requirements or specifications for compensation to submit a bid or proposal for that procurement or any portion thereof if the public body determines that the exclusion of such supplier would limit the number of potential qualified bidders or offerors in a manner contrary to the best interests of the public body (*Code of Virginia*, [§2.2-4373](#)) or in the event of an emergency.

Specifications or requirements may be provided to potential suppliers for comments and feedback before the solicitation is issued. Commonwealth agencies should leverage the expertise of suppliers in understanding the market for a particular IT good or service. Suppliers may provide helpful information to the agency by identifying restrictive or proprietary features included in the specifications or requirements which could be challenged by other potential suppliers causing delays and/or cancellations. Suppliers can also assist the Commonwealth in understanding what end users really need to achieve their desired business processes, what the commercial and government best practices are in a particular IT area and who the experts are in the marketplace for a particular technical solution.

[§2.2-4373](#) of the *Code of Virginia* provides as follows: "Participation in bid preparation; limitation on submitting bid for same procurement. No person who, for compensation, prepares an invitation to bid or request for proposal for or on behalf of a public body shall (i) submit a bid or proposal for that procurement or any portion thereof or (ii) disclose to any bidder or offeror information concerning the procurement that is not available to the public. However, a public body may permit such person to submit a bid or proposal for that procurement or any portion thereof if the public body determines that the exclusion of the person would limit the number of potential qualified bidders or offerors in a manner contrary to the best interests of the public body."

Of course, care should be taken in accepting assistance from outside entities, even if uncompensated, so as to ensure that the resulting solicitation is not biased or "wired." See subsection 8.8.6.